

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: SATO

Serial No.: 10/615,801

Filed: 07/10/2003

Title: MANUFACTURING METHOD OF
WATER EMULSION FUEL



Atty. Dkt.: VX032544

Group Art Unit: 1797

Examiner: TOOMER

Confirmation No.: 1911

Patent No.: 7,559,960 B2

Issued: July 14, 2009

Commissioner for Patents

Alexandria, VA 22313-1450

Mail Stop: Certificate of Corrections Branch

Date: June 8, 2010

REQUEST FOR CERTIFICATE OF CORRECTION UNDER 37 CFR 1.322

Sir:

The patentee hereby requests that the above-identified Letters Patent be corrected as to claims 2, 3 and 5 (Columns 8 and 9) on the last two pages of the patent. Specifically, the Letters Patent should be corrected to read as:

IN THE CLAIMS:

Col. 8, claim 2, line 2, change "hales" to --holes--
claim 3, line 7, change "fonning" to --forming--
claim 3, line 12, change "tunic" to --tank--
claim 5, line 8, change "fanning" to --forming--and
claim 5, line 13, change "fanning" to --forming--.

Col. 9, claim 5, line 16, change "fanning" to --forming--
claim 5, line 17, change "mixing tank" to --the mixing tank--
claim 5, line 20, change "fanning" to --forming--and
claim 5, line 23, change "hales" to --holes--.

To facilitate the above request a copy of the last two pages of the originals Letters Patent (with corrections) and a copy of the allowed claims are attached as proof that the above-noted errors were due to a mistake made by the USPTO.

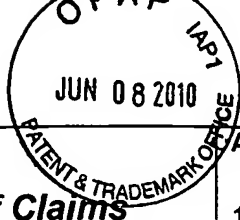
The patentee also requests that the attached Certificate of Correction be attached to all copies of the Letters Patent.


Once the present Request is granted, please forward the present file to the Certificate of Corrections Branch for issuance of a Certificate of Correction, a copy of which is attached. Although it is believed there are no fees due at this time, authorization is hereby given to charge any unforeseen fees to Deposit Account 50-1147.

Respectfully submitted,

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| | | |
|---|--|--|
| Index of Claims  | Application/Control No. 10615801 | Applicant(s)/Patent Under Reexamination SATO, HIROYASU |
| | Examiner Cephia D Toomer | Art Unit 1797 |

| | | | | | | | |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant | | | <input type="checkbox"/> CPA | | | <input type="checkbox"/> T.D. | | | <input type="checkbox"/> R.1.47 | | |
|--|----------|------|------------------------------|--|--|-------------------------------|--|--|---------------------------------|--|--|
| CLAIM | | DATE | | | | | | | | | |
| Final | Original | | | | | | | | | | |
| 1 | 11 | = | | | | | | | | | |
| 2 | 12 | = | | | | | | | | | |
| 3 | 13 | = | | | | | | | | | |
| 4 | 14 | = | | | | | | | | | |
| 5 | 15 | = | | | | | | | | | |
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Serial No. 10/615,801

Attorney Docket No. VX032544

LISTING OF CLAIMS:

1-10 (Canceled)

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11. (Currently amended) A method of manufacturing an emulsion of water and fuel using a series of batch processing steps comprising:

- (a) charging a fuel and an additive into a mixing tank;
- (b) agitating the fuel and the additive charged into the mixing tank;
- (c) charging water into the mixing tank and forming a mixture solution of the fuel, additive and water, while agitating the mixture solution;
- (d) reducing cluster sizes of the fuel and water in the mixture solution by pumping the mixture solution through a processing means and returning the mixture solution into the mixing tank;
- (e) separating the mixture solution in the mixing tank and forming a water rich portion of the mixture solution at a bottom portion of ~~a mixing~~ the mixing tank; and
- (f) emulsifying the mixture solution from the bottom portion of the mixing tank at first through the processing means and returning the mixture solution to the mixing tank, thereby forming the emulsion of water and fuel,

wherein the processing means includes at least one plate having holes therein, and in steps (d) and (f) the mixture solution passes through the holes in the at least one plate.

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12. (Previously presented) The method of manufacturing the emulsion of water and fuel according to claim 11, wherein the holes have a diameter of about 0.5 mm to 1 mm.

13. (Previously presented) A method of manufacturing an emulsion of water and fuel using a series of batch processing steps comprising:

(a) charging a fuel and an additive into a mixing tank containing the emulsion of water and fuel having a first volume;

(b) agitating the emulsion of water and fuel having a first volume together with the fuel and additive and forming a first mixture solution;

(c) charging water into the mixing tank and forming a second mixture solution; and

(d) emulsifying the second mixture solution by pumping the second mixture solution from the mixing tank through a processing means, which reduces clusters of liquid molecules in the mixture solution into smaller clusters, and returning the resulting emulsion of water and fuel having a second volume larger than the first volume to the mixing tank,

wherein the processing means includes at least one plate having holes therein, and in step (d) the mixture solution passes through the holes in the at least one plate.

14. (Previously presented) The method of manufacturing the emulsion of water and fuel according to claim 13, wherein the holes have a diameter of about 0.5 mm to 1 mm.

15. (Currently amended) A method of manufacturing an emulsion of water and fuel using a series of batch processing steps comprising:

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- (a) charging a fuel and an additive into a mixing tank;
 - (b) agitating the fuel and the additive charged into the mixing tank and forming a mixed solution of the fuel and additive;
 - (c) charging and mixing water into the mixing tank and forming a first mixture solution of the fuel, additive and water;
 - (d) reducing clusters of liquid molecules in the first mixture solution into smaller clusters by pumping the first mixture solution through a processing means and returning to the mixing tank, thereby forming a second mixture solution of the fuel, additive and water;
 - (e) separating the second mixture solution in the mixing tank and forming a water rich portion in the second mixture solution at a bottom portion of ~~a mixing~~ the mixing tank; and
 - (f) emulsifying the separated second mixture solution from the bottom portion of the mixing tank at first through the processing means, thereby forming the emulsion of water and fuel,
- wherein the processing means includes at least one plate having holes therein, in step (d) the first mixture solution passes through the holes in the at least one plate, and in step (f) the second mixture solution passes through the holes in the at least one plate.

16. (Previously presented) The method of manufacturing the emulsion of water and fuel according to claim 15, wherein the holes have a diameter of about 0.5 mm to 1 mm.

Namely, in the batch type manufacturing method of the water emulsion fuel, the O/W type water emulsion fuel of good quality can be reliably obtained in the initial manufacturing process of manufacturing the water emulsion fuel from the state in which substantially no water emulsion fuel exists in the mixing tank.

FIG. 2 is a flow chart of manufacture of a second embodiment. The explanation of the same parts as in the first embodiment will be omitted, and only a different part will be explained. Between B and C, an agitating step is provided in parallel with the fine processing step, and the controller 35 outputs a control signal to drive an agitating device 3. Between D and E, the agitating step is provided in parallel with the emulsifying step, and the controller 35 outputs the control signal to drive the agitating device 3. As a result, the fuel, the additive and water are mixed further uniformly, and emulsification of the fuel and water is further promoted. The agitating step may be provided either between B and C, or between D and E.

FIG. 3 relates to a third embodiment, and shows a manufacturing step of the batch type process from the second time on. This manufacturing process is for manufacturing the water emulsion fuel from the state in which a predetermined amount of water emulsion fuel exists in the mixing tank 2, namely, from the state in which the water emulsion fuel remains up to the position of the low-level liquid level switch 33 of the mixing tank 2 after the water emulsion fuel is pumped out into the oil storage tank 4 from the mixing tank 2. Hereinafter, the explanation will be made based on FIG. 3 and FIG. 4.

(a) In the fuel and additive charging step at the point A, the controller 35 outputs the control signal to close the solution delivery circuit on-off valve 13 and opens the circulation circuit on-off valve 15. Next, the controller 35 outputs the control signal to the fuel circuit on-off valve 22 to open it, and supplies the petroleum fuel onto the water emulsion fuel remaining in the mixing tank 2 from the fuel supply circuit 21 until the fuel level switch 32 is turned ON, and closes the fuel circuit on-off valve 22. At the same time, the controller 35 outputs the control signal to the additive metering pump 26 to add a predetermined amount of additive into the mixing tank 2 from the additive supply circuit 25.

(b) In the agitating step between A and B, the controller 35 outputs the control signal to operate the agitating device 3 simultaneously with the start of the fuel supply, agitates the water emulsion fuel, the fuel, and the additive for a predetermined period of time. Due to this, the additive is favorably dispersed into the fuel.

(c) After the agitating step is finished, in the water charging step at the point B, the controller 35 outputs the control signal to the water circuit on-off valve 24 to open it, supplies the water to the mixing tank 2 from the water supply circuit 23 until the water level switch 31 is turned ON, and closes the water circuit on-off valve 24.

(d) In the emulsifying step between B and C, the controller 35 outputs the control signal to drive the mixture solution pump 11 simultaneously with the start of the water charging step. The charged solution passes through the fine processing means 12 to return to the mixing tank 2. Since the water emulsion fuel remaining at the bottom part of the mixing tank 2 precedes at this time, the water rich state is established, and the water and the fuel are emulsified, thus obtaining the O/W type water emulsion fuel.

As in the above-described third embodiment, the manufacturing process from the second time on has smaller number of steps, and the O/W type water emulsion fuel can be manu-

factured efficiently in a short time. The agitating step may be provided in parallel with the emulsifying step of this process.

What is claimed is:

1. A method of manufacturing an emulsion of water and fuel using a series of batch processing steps comprising:

- (a) charging a fuel and an additive into a mixing tank;
 - (b) agitating the fuel and the additive charged into the mixing tank;
 - (c) charging water into the mixing tank and forming a mixture solution of the fuel, additive and water, while agitating the mixture solution;
 - (d) reducing cluster sizes of the fuel and water in the mixture solution by pumping the mixture solution through a processing means and returning the mixture solution into the mixing tank;
 - (e) separating the mixture solution in the mixing tank and forming a water rich portion of the mixture solution at a bottom portion of the mixing tank; and
 - (f) emulsifying the mixture solution from the bottom portion of the mixing tank at first through the processing means and returning the mixture solution to the mixing tank, thereby forming the emulsion of water and fuel, wherein the processing means includes at least one plate having holes therein, and in steps (d) and (f) the mixture solution passes through the holes in the at least one plate.
2. The method of manufacturing the emulsion of water and fuel according to claim 1, wherein the holes have a diameter of about 0.5 mm to 1 mm.

3. A method of manufacturing an emulsion of water and fuel using a series of batch processing steps comprising:

- (a) charging a fuel and an additive into a mixing tank containing the emulsion of water and fuel having a first volume;
- (b) agitating the emulsion of water and fuel having a first volume together with the fuel and additive and forming a first mixture solution;
- (c) charging water into the mixing tank and forming a second mixture solution; and
- (d) emulsifying the second mixture solution by pumping the second mixture solution from the mixing tank through a processing means, which reduces clusters of liquid molecules in the mixture solution into smaller clusters, and returning the resulting emulsion of water and fuel having a second volume larger than the first volume to the mixing tank,

wherein the processing means includes at least one plate having holes therein, and in step (d) the mixture solution passes through the holes in the at least one plate.

4. The method of manufacturing the emulsion of water and fuel according to claim 3, wherein the holes have a diameter of about 0.5 mm to 1 mm.

5. A method of manufacturing an emulsion of water and fuel using a series of batch processing steps comprising:

- (a) charging a fuel and an additive into a mixing tank;
- (b) agitating the fuel and the additive charged into the mixing tank and forming a mixed solution of the fuel and additive;
- (c) charging and mixing water into the mixing tank and forming a first mixture solution of the fuel, additive and water;
- (d) reducing clusters of liquid molecules in the first mixture solution into smaller clusters by pumping the first mixture solution through a processing means and returning to the mixing tank, thereby forming a second mixture solution of the fuel, additive and water;



holes



forming



tank



forming

forming



9

10

forming
the mixing tank

forming
holes

(e) separating the second mixture solution in the mixing tank and forming a water rich portion in the second mixture solution at a bottom portion of mixing tank and (f) emulsifying the separated second mixture solution from the bottom portion of the mixing tank at first through the processing means, thereby forming the emulsion of water and fuel, wherein the processing means includes at least one plate having holes therein, in step (d) the first mixture solution

passes through the holes in the at least one plate, and in step (f) the second mixture solution passes through the holes in the at least one plate.

6. The method of manufacturing the emulsion of water and fuel according to claim 5, wherein the holes have a diameter of about 0.5 mm to 1 mm.

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UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 1

PATENT NO. : 7,559,960

APPLICATION NO.: 10/615,801

ISSUE DATE : July 14, 2009

INVENTOR(S) : Hiroyasu Sato

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE CLAIMS:

- Col. 8, claim 2, line 2, change "hales" to --holes--
- claim 3, line 7, change "fonning" to --forming--
- claim 3, line 12, change "tunic" to --tank--
- claim 5, line 8, change "fanning" to --forming--and
- claim 5, line 13, change "fanning" to --forming--.
- Col. 9, claim 5, line 16, change "fanning" to --forming--
- claim 5, line 17, change "mixing tank" to --the mixing tank--
- claim 5, line 20, change "fanning" to --forming--and
- claim 5, line 23, change "hales" to --holes--.

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This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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